

REMARKS

The specification was objected to for informalities. Applicant requests reconsideration. The specification has been accordingly amended. The claims 9 and 10 were rejected as indefinite. The claims 9 and 10 have been canceled without prejudice.

Claim 1 and 8 were rejected as unpatentable over Beauducel in view of Palmer. Claims 2-4 and 11 were rejected as unpatentable over Beauducel in view of Palmer in view of Potratz. Claim 5 was rejected as unpatentable over Beauducel in view of Palmer in view of Scott. Claims 6-7 were rejected as unpatentable over Beauducel in view of admitted prior art. Applicant requests reconsideration.

Regarding claims 1 and 11, Beauducel teaches an analog input, a delta sigma modulator, a communication system having a transmitter, a medium, a receiver, and a data detector for providing a digital output. The invention includes an analog input, a delta sigma modulator, a laser communication system having a laser transmitter, a laser medium, and a laser receiver, as well as a data detector for providing a digital output. A unique aspect of the present invention, as correctly noted by the examination, is the communication of an on and off "binary modulated laser signal" through a laser communication system. The on and off laser communication can be performed at very high switching speeds for bandwidth efficiencies. What is obviously missing from the examination analysis is the reason for the using the binary modulated laser signal.

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2 The examination concedes that Beauducel does not teach a
3 modulated binary laser signal. The examination's suggestion that
4 Beauducel teaches that different types of transmitters could be
5 used, as anything is possible, fails to recite the reasons for the
6 particular type of communications in Beauducel and the differing
7 particular type of communications in the present invention. The
8 examination incorrectly references Palmer as purportedly teaching
9 that a sigma-delta modulator can be used with a laser transmitter.
10 The use of a sigma-delta modulator in Palmer is not related to
11 sigma-delta modulation of an input analog signal, and Palmer is
12 irrelevant in all regards to the present invention, other than to
13 state that sigma-delta modulators are known devices. Palmer teaches
14 that "fractional frequency dividers using sigma delta modulation
15 may be used for the generation of subinterger multiples of the base
16 frequency" for RF communications which certainly does not relate to
17 binary laser communications. (Col 3 line 45, Col 4 line 22)
18

19 The sigma-delta modulator can generate high-speed pulse width
20 modulated signals. By using the high speed on and off laser
21 switching during laser transmitter and receiver communications, the
22 varying modulated pulse widths of the pulse width modulated sigma-
23 delta signal can be communicated and detected upon reception
24 through an on and off laser communication system. It is the
25 combination of sigma-delta pulse width modulated signaling and
26 binary modulated laser communications that enables precise
27 communications of the time varying pulse width modulated sigma-
28 delta signal.

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2 Beauducel fails to teach using on and off binary modulated
3 laser signal for communicating a pulse width modulated sigma-delta
4 signal. Beauducel appears to be directed towards a slow two-line
5 synchronous multi-level communication system. Rather than
6 communicating a binary signal representing a sigma-delta pulse
7 width modulated signal, Beauducel first encodes the sigma-delta
8 signal into a multi-level coded signal that is time stamped, and
9 then accordingly apparently varies the amplitude of a light
10 emitting diode. Hence, Beuaducel teaches a multi-level encoded
11 sigma-delta signal and multi-level modulated laser signal
12 communications. (Col 3 line 55-62) The intensity switching of a
13 laser diode between various levels is not simple on or off
14 toggling. The purpose of direct binary modulation of the on or off
15 toggling laser signal is to take advantage of the high speed at
16 which lasers can toggle for precisely replicating the varying pulse
17 widths of the pulse width modulated signal. Beauducel teaches just
18 the opposite, by teaching encoded sigma-delta signaling for M-ary
19 multi-level states, with time codes with the use of intensity level
20 modulation. That is, Beauducel encodes the sigma-delta signal with
21 timing clocking information so that the communicated signal is
22 self-clocking, and with reference to a clock, provides for
23 synchronous communications of an M-ary signal. The present
24 invention does not encode the sigma-delta signal with time
25 information, and as such, the communication is inherently and
26 preferably asynchronous in the present invention. Thus, Beauducel
27 uses encoded sigma-delta time-stamped multi-level signal with M-ary
28 intensity modulation for synchronous communications, whereas the

1 present invention uses pulse width modulated sigma-delta signaling
2 with on and off binary laser modulation for asynchronous
3 communications. The two signaling methods are directly contrary to
4 each other, and as such, Beauducel is strong evidence of
5 nonobviousness.

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7 The examination concedes that Beauducel, Palmer, and Potratz
8 do not disclose a pulse width modulated signal detector, yet the
9 examination rejects the claims for obviousness based upon
10 conclusionary statements directed to their combined teachings. Yet,
11 none of these cited references teaches direct binary laser
12 modulation of a pulse width sigma-delta signal, as such, the cited
13 references in combination are strong evidence that the examination
14 is engaged in forbidden hindsight reconstruction as all references
15 fail to recognize that pulse width modulation of a sigma-delta
16 modulator, communicated by a high speed binary modulated signal,
17 would allow for high speed communications of an analog input
18 received as a digital signal. Also, Scott's use of a sigma-delta
19 modulator on the received side seems highly irrelevant as well. It
20 is not that isolated elements can be found in the cited references,
21 but rather whether the combined teachings as a whole would suggest
22 the claimed combination. None of the cited references teach the use
23 of a sigma-delta modulator for providing a pulse width modulated
24 signal for communicating an analog input signal as a binary
25 modulated laser signal. Allowance of the claims is requested.

26 Respectfully Submitted

27 *Derrick Michael Reid*

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